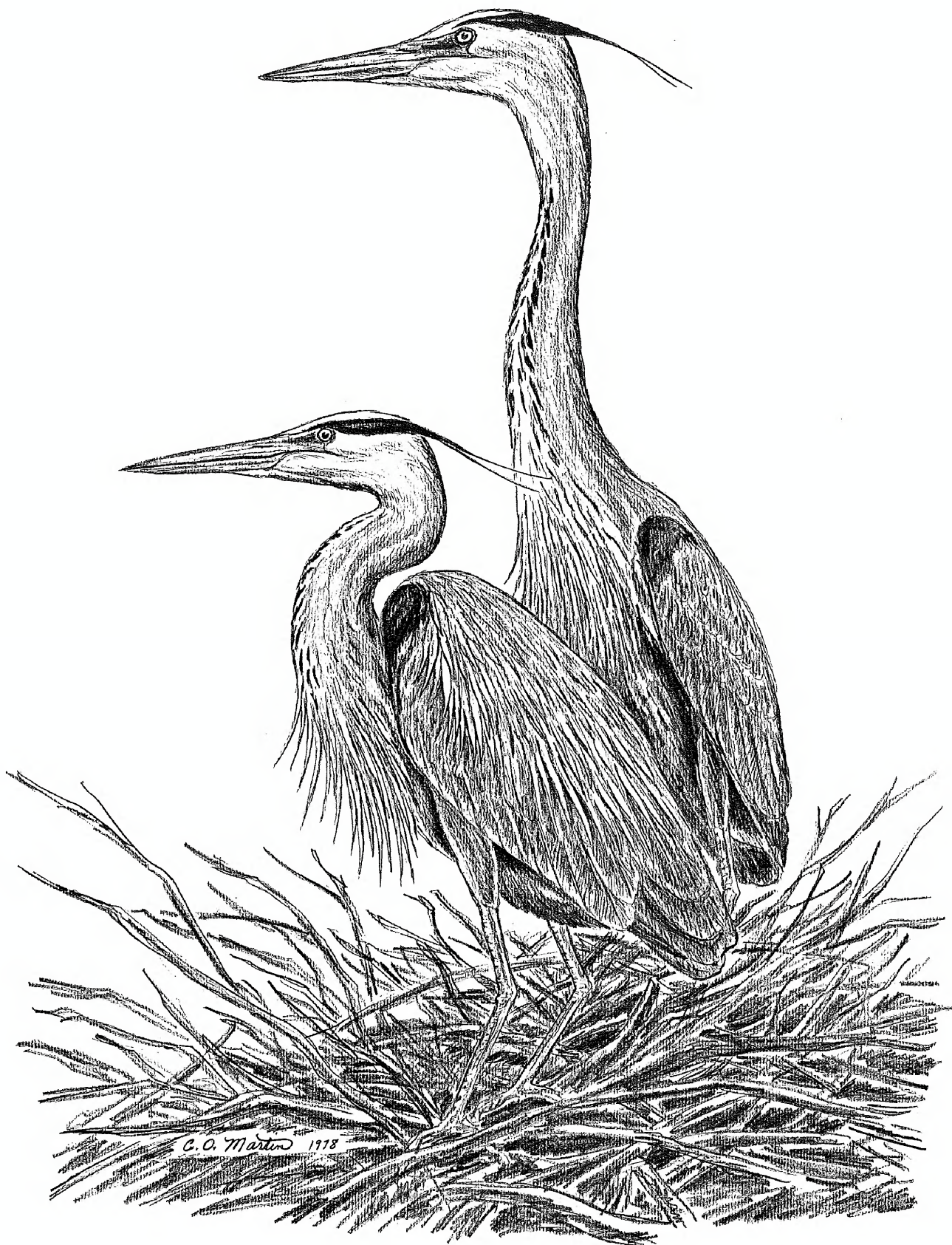


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An Evaluation of the Status of Some Red-cockaded Woodpecker Colonies in East Texas

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The Red-cockaded Woodpecker (*Picoides borealis*) is an endangered species which has been declining in numbers as a result of habitat loss (Jackson 1971, U.S.D.I. 1973). The habitat loss has resulted from clearing of forested land for many human activities and from present forest management activities. These unusual birds excavate their nest and roost cavities in living pines that average 70 years old or older (e.g., Jackson 1977a). Such old trees are now considered beyond prime economic maturity and harvesting of southern pines generally occurs before the trees reach 60 years old.

This report is an evaluation of the status of 23 colonies reported by the U.S. Forest Service to occur in Texas national forests. In addition to evaluating the status of these colonies, we will comment on the general state of the pine forest habitat in the areas of east Texas which we visited.

Methods

We visited portions of the Sabine, Angelina, and Davy Crockett National Forests in east Texas from 19 through 21 March 1977. Equipped with Forest Service maps which indicated colony locations, we selected and visited colonies which appeared from the maps to be relatively accessible, though some were nearly a kilometer from the nearest road. If a colony was not immediately located, the three of us split up and systematically searched the area until the colony was located or we found reason to believe the cavity trees were missing. A colony was considered active if Red-cockaded Woodpeckers were observed or if cavity trees showed signs of recent Red-cockaded Woodpecker activity such as red, freshly worked resin wells. See Jackson (1977b) for details of how to evaluate the status of a Red-cockaded Woodpecker colony.

After a few colonies were studied in one area, we moved to a distant area in order to see how conditions might vary among the national forests. None of us had previously visited any of the colonies or any of the areas of the national forests visited on this trip. Selection of colonies to visit was done before reaching the general area where the colony was located. Finally, to further insure objectivity in our evaluation, we did not discuss our trip with anyone knowledgeable of the Texas national forests or Red-cockaded Woodpeckers in Texas. In the process of evaluating the status of the 23 colonies we drove 578 km in eight east Texas counties (Shelby, San Augustine, Sabine, Angelina, Nacogdoches, Cherokee, Houston, and Trinity). This gave us a general familiarity with habitat conditions both on and off the national forests.



Fig. 1. This is the site of Colony 2 on the Sabine National Forest. Many of the older trees have been removed following an infestation by southern pine beetles. The density of hardwoods and decrease in numbers of older trees make the site suboptimal for Red-cockaded Woodpeckers, though we did see the birds in the area.

Results

The following accounts summarize our observations. Colony numbers are those assigned by the Forest Service.

Sabine National Forest

Colony 1.—The cavity tree in this colony and some surrounding trees were marked with yellow paint. This tree had several very old cavity starts; the gum was dried and black. In addition to the cavity tree reported by the Forest Service, we located another tree with a very old cavity start approximately 70 m south of the marked tree. There was no sign of Red-cockaded Woodpecker foraging activity in the area. This section of the forest was recently burned and the understory before the fire was obviously very dense. An adjacent stand was marked for cutting as a result of southern pine beetle (*Dendroctonus frontalis*) damage.

Colony 2.—Although we had no difficulty locating the reported colony site, we could not locate a cavity tree. We did, however, observe two Red-cockaded Woodpeckers in the area; on that basis we consider the colony active. There apparently was a bad wind storm in the area about a year ago. Many trees were blown over to the northeast and some sweetgum (*Liquidamber styraciflua*) trees that were blown over had new growth that was about a year old. Following the storm damage the pines became heavily infested with southern pine beetles and many additional trees were killed. A timber sale in the area has resulted in re-



Fig. 2. Colonies 4 and 7 on the Sabine National Forest were likely once part of the same colony. The cavity tree labelled as Colony 7 has been abandoned by Red-cockaded Woodpeckers. The site of Colony 4 is to the left in this picture, that of "Colony" 7 is to the right of the clearcut. Red-cockaded Woodpeckers still apparently forage on both sides of the clearcut and are likely exposed to an increased danger of predation by hawks. We recommend that cavity trees within a colony not be isolated by such clearcuts.

removal of many of the dead and dying trees (Fig. 1). There were several large stumps in the approximate location of the reported cavity tree. This area also had recently been burned and had a dense understory.

Colony 4.—This was an active colony; we heard one Red-cockaded Woodpecker, and two of the cavity trees appeared active. Both active cavity trees were shortleaf pines (*Pinus echinata*). There had been considerable clearcutting on all sides of the colony, though the colony site was tied in with suitable forest area for foraging.

Colony 6.—We located the reported cavity tree, a loblolly pine (*Pinus taeda*) which had a freshly painted band of yellow paint around it. The cavity tree was also surrounded by a ring of trees with yellow paint on them. The cavity in this tree was an old start. There was no sign of Red-cockaded Woodpecker foraging activity in the area. There were many trees in this area old enough for cavity excavation by Red-cockaded Woodpeckers, but the understory was extremely dense and possibly not suitable for the birds.

Colony 7.—The cavity tree had two very old cavities that had been enlarged by Pileated Woodpeckers (*Dryocopus pileatus*). This tree was definitely inactive as far as Red-cockaded Woodpeckers are concerned. The distance between colonies 4 and 7 and the uniformity of the habitat suggested that colonies 4 and 7 were at one time part of the same colony. The two are now separated by a clearcut



Fig. 3. Colony 1 on Angelina National Forest was still active when we visited it, but will likely be abandoned if the dense young pines in the understory are allowed to grow to cavity height. We recommend that stands of young pines such as seen here be thinned to prevent them from obscuring cavity entrances.

(Fig. 2). Trees throughout the area encompassing colonies 4 and 7 showed the red, smooth-barked appearance characteristic of Red-cockaded Woodpecker foraging activity. It appeared that the birds in colony 4 are crossing the clearcut area in order to forage in their old range. A thorough search of the area revealed no new cavity trees.

Colony 20.—The Forest Service indicated that this colony was lost to wind. We visited the area anyway and searched for possible new cavity trees. We found none. The colony site is now a large clearcut.

Colony 21.—The cavity tree was a shortleaf pine and was marked with a broken band of yellow paint. There were four cavity starts in the tree, all of which looked old. None of these starts looked like the work of a Red-cockaded Woodpecker. All were rectangular in shape and appeared to be work of a Pileated Woodpecker. An immediately adjacent area had had a lot of trees cut out of it. There was no sign of Red-cockaded Woodpecker foraging activity in the area.

Angelina National Forest

Colony 1.—This colony was found as indicated on the Forest Service map. Two of the cavity trees appeared active. A third tree had two cavities enlarged by Pileated Woodpeckers and one enlarged by a Red-bellied Woodpecker (*Melanerpes carolinus*). This tree did not appear to be used by Red-cockaded Woodpeckers. The cavity in the fourth tree had been enlarged by a Red-bellied Wood-

pecker and appeared to still be used by the Red-cockaded Woodpeckers. We heard three Red-cockaded Woodpeckers near this colony. These cavity trees were marked with green paint. Young pines were very dense in this area and in need of thinning to keep them from blocking cavity entrances and to maintain the relatively open forest that this species seems to prefer (Fig. 3; Jackson 1971).

Colony 2.—A new forest service road was under construction at the precise mapped location of this colony. One of the three trees reported for this colony had a Forest Service metal tag identifying it as cavity tree number 55. This tree was within 2 meters of the new road and none of the eight cavities had been used by Red-cockaded Woodpeckers for some time. A second cavity tree was approximately 50 m south of tree 55 and was marked with an old band of yellow paint. This tree was also not being used by Red-cockaded Woodpeckers. We found no other cavity trees in the area, but in our search for these trees and for those in Colony 3, we observed that most large trees in the area were marked for cutting. Forest Service personnel indicate that the third cavity tree is still present and that it appears active (J. H. Courtenay, pers. comm.).

Colony 3.—We searched for this colony for nearly two hours but were unable to locate it. As mapped, it is near Colony 2 and possibly part of it. Some smooth barked trees suggested that Red-cockaded Woodpeckers were present in the area. If this colony is still active, the bird's future will certainly be jeopardized if a planned timber sale takes place. Subsequent to our visit Forest Service personnel visited the area and found five cavity trees which they considered active; they also reported hearing two Red-cockaded Woodpeckers in the colony (J. H. Courtenay, pers. comm.).

Davy Crockett National Forest

Colony 7.—We found the cavity tree that was mapped as being farthest from the road. This shortleaf pine had not been used by Red-cockaded Woodpeckers for several years. The tree had two old cavities, one enlarged by Pileated Woodpeckers. This tree is now adjacent to a logging road and a large clearcut. We could not locate the second cavity tree reported for this colony, but blue flagging led us to its mapped location where we found a stump and a clearcut. There was no sign of recent Red-cockaded Woodpecker activity in the area.

Colony 8.—Blue flagging marked the site of this colony. We found one dead Red-cockaded Woodpecker tree standing and one on the ground. There was no sign of recent Red-cockaded Woodpecker activity in the area.

Colony 9.—We found the single cavity tree reported for this colony and could find no other cavity trees. This tree, a shortleaf pine, had only a single cavity and that was enlarged by a Pileated Woodpecker and showed no sign of recent use by Red-cockaded Woodpeckers. This colony was also clearly marked by blue flagging.

Colony 11.—We found a single cavity tree as mapped. This tree had a silver band painted around it and was also marked by blue flagging. There were two cavities in this shortleaf pine; both appeared active, though one had been enlarged by a Red-bellied Woodpecker. We neither saw nor heard Red-cockaded Woodpeckers in the area, but believe that this was an active colony on the basis of the cavity appearance and signs of Red-cockaded Woodpecker foraging activity in the area.

Colony 31.—The cavity tree mapped as closest to the road was found. This shortleaf pine had an old start in it. We were unable to locate the second mapped tree though we spent an hour and a half searching for it. There were several trees in the area with gum flow resulting from the work of Yellow-bellied Sapsuckers (*Sphyrapicus varius*) and it is possible that one of these trees was mistaken for a Red-cockaded Woodpecker cavity tree. A third, unmapped tree was found about 0.2 km north along the east side of the highway. This tree had only two cavity starts in it and these appeared to be the work of a Pileated Woodpecker. We observed a male Pileated Woodpecker excavating a cavity in a nearby recently dead pine.

Colony 35.—The precise location of this reported colony was a small cleared area used as a borrow pit. There were several large stumps in the area, but no sign of Red-cockaded Woodpecker activity. One pine adjacent to the borrow pit has extensive sapsucker work on it and may have been mistaken for a Red-cockaded Woodpecker tree.

Colony 37.—We could not locate the reported cavity tree in this colony, but we did observe one Red-cockaded Woodpecker. On this basis, we consider the colony active. The understory was very dense in the area and in need of management.

Colony 38.—Of the four reported cavity trees in this colony, only one appeared active. Others had very old enlarged cavities. We found a fifth cavity tree that was dead. Although we were at this colony when the birds should have been coming to roost, we neither saw nor heard any. We tentatively consider this colony active on the basis of the appearance of resin wells and gum flow at the one cavity tree.

Colony 40.—There was only one cavity tree in this colony indicated on the Forest Service map. We found this and two additional trees—all shortleaf pine. One cavity had been enlarged by a Pileated Woodpecker, one appeared to be an active Red-cockaded Woodpecker cavity, and one was a fresh cavity start.

Colony 59.—This was an active colony. In addition to the mapped cavity trees we found one new tree—apparently also recently discovered by the Forest Service since the tree was flagged with blue flagging. The cavity trees on the south side of the highway were in a narrow stretch of woods between the highway and a clearcut. One of these trees had snapped off at the cavity. The clearcut had left the tree exposed to the south and thus more vulnerable to wind damage. The new cavity tree now makes Colony 59 only a kilometer from Colony 61. The habitat between these colonies was very uniform and Red-cockaded Woodpecker foraging activity was obvious for the whole distance between the colonies. We consider the cavity trees of these two reported colonies to actually be part of a single colony.

Colony 61.—The single cavity tree in this colony was adjacent to a clearcut on industry land. While the tree appears active, we consider it to be a part of Colony 59 which was only a kilometer to the west.

Colony 63.—The single cavity tree in this colony was dead and the cavity had been enlarged by a Pileated Woodpecker some time ago. We found no other cavity trees and no sign of Red-cockaded Woodpecker foraging activity in the area. There were many potential cavity trees in the area, although the understory was quite thick.

Colony 67.—We found the mapped cavity tree, a loblolly pine with an active cavity in it. We neither heard nor saw Red-cockaded Woodpeckers. The understory in the area was very dense and in need of burning.

Discussion

Of the 23 reported Red-cockaded Woodpecker colonies we visited on the Texas national forests, only 11 could be considered active, separate colonies with any assurance. Another reported colony included an active cavity tree, but it is highly probable that this single tree was used by the birds occupying an adjacent colony. Only two of the 11 inactive colonies were considered inactive by the Forest Service. Three colonies had been reported as "status unknown." Thus, based on our sample it appears that the Red-cockaded Woodpecker populations on the Texas national forests have declined by 50% or more since they were censused by the U.S. Forest Service between 1971 and 1975. Alternatively, the original census may have included some abandoned colonies, resulting in an overestimate of the species' numbers. Forest Service data provided on 1 October 1976 to the U.S. Department of the Interior's Red-cockaded Woodpecker Recovery Team indicate that, based on their 1971–1975 data, there were 236 Red-cockaded Woodpecker colonies on the Texas national forests. We estimate, based on these numbers, and the percentage of inactive colonies in our sample, that there may be 118–130 active Red-cockaded Woodpecker colonies on these forests. Furthermore, when estimating colony numbers the Forest Service considered cavity trees located 0.4 km apart as being separate colonies (David G. Oats, pers. comm.). We have found colonies with cavity trees that were over 1.1 km apart (Jackson et al. 1976 and Jackson unpublished data for Noxubee National Wildlife Refuge and Ft. Benning, Ga.). Thus, there may be even fewer colonies on the Texas national forests than we have estimated.

As we traveled through east Texas in search of Red-cockaded Woodpecker colonies, it became very clear that if there is to be any hope for the survival of this species in Texas, the species and its habitat must be protected and properly managed on the national forests. We saw few forest areas outside of the national forests that resembled suitable habitat for this endangered woodpecker. While the species occurs in modest numbers on the national forests in Texas, the large percentage of abandoned colonies, large clearcuts, and dense understory in many colonies suggest a dim future for the species.

While the Forest Service has developed management guidelines for the Red-cockaded Woodpecker (Forest Service Handbook—R8, January 1975), there still appear to be difficulties in implementing them. Pine regeneration and/or hardwood understories were too dense in most colonies visited and may have contributed to the abandonment of some of those colonies judged inactive. Clearcuts and road construction were very close to cavity trees—well within the supposed 61 m buffer recommended by the Forest Service.

Much of the national forests which we visited had stands of pines that were at least approaching the age where Red-cockaded Woodpeckers might use them for cavity trees. With proper management the status of the Red-cockaded Woodpecker in Texas could improve within a few years. We feel that management should include longer rotations for the pines (80 years for loblolly and shortleaf, 100 years for longleaf [*Pinus palustris*]), more frequent prescribed burning to

control understory, and elimination of clearcutting as it is now practiced. Our recommendation for rotation age is based on the known ages of Red-cockaded Woodpecker cavity trees in other parts of the species range (e.g., Jackson 1977a). Our recommendation for the restriction of clearcutting is based on our studies of the ecology of the species in Mississippi which indicate that all ages of pine are needed and used for foraging at different times of the year and on our observation of colonies in Texas which were apparently split by clearcuts. It is often difficult to determine which colony a peripheral cavity tree belongs with and isolation of such trees from the main part of a colony could result in loss of a clan member and perhaps abandonment of a colony.

We gratefully acknowledge the financial support of the U.S.D.A. Forest Service through a contract to Jackson from the Southeastern Forest Experiment Station, Clemson, S. C. We also appreciate the efforts of the personnel on the Texas national forests in locating and mapping Red-cockaded Woodpecker colony sites. Mr. John Courtenay, Forest Supervisor, National Forests in Texas, commented on an earlier draft of the manuscript and provided information which clarified some of our observations.

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County Records for Bird Specimens in the Sul Ross State University Collection Not Reported in Oberholser's "The Bird Life of Texas"

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Oberholser's mammoth volumes (1974, *The Bird Life of Texas*, Univ. Texas Press, Austin) left large gaps in the ranges of certain species recorded in Texas. Barr et al. (1975, Bull. Texas Ornith. Soc. 8:8-10) summarize specimens in the Texas Cooperative Wildlife Collection which provide documentation in those counties for which Oberholser (1974, op.cit.) lists no record.

This is a compilation of specimen records in the vertebrate collection of the Dept. of Biology at Sul Ross State University for which no records exist in Oberholser (or in the work by Barr et al. 1975, op. cit.).

The rules for inclusion remain unchanged: 1) only those specimens for which no county record was given either on the distribution map or in the text were listed (with the exception of three species new to Oberholser which were documented by Barr et al. 1975, op. cit.); 2) no attempt was made to include sight records in the listing; 3) the listing follows the taxonomic order used in Oberholser (1974, op. cit.); 4) scientific nomenclature follows the A.O.U. Checklist of North American Birds (1957, 5th edition), The Thirty-second Supplement (1973, Auk 90:411-419), the Corrections and Additions to the Thirty-second Supplement (1973, Auk 90:887) and the Thirty-third Supplement (1976, Auk 93:875-879); and 5) where it differs, the Oberholser nomenclature will be given in parentheses. Additionally, the current standard common name will be given to facilitate recognition by those persons unfamiliar with scientific nomenclature.

SPECIES		COUNTY	DATE
<i>Podiceps nigricollis</i> (<i>Proctopus caspicus</i>)	Eared Grebe	Kinney	Nov 1971
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Terry	Oct 1966
<i>Butorides striatus virescens</i> (<i>Butorides virescens</i>)	Green Heron	Brooks	Jun 1973
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Presidio	Feb 1978
<i>Branta canadensis parvipes</i>	Canada Goose	Lamb	Jan 1972
<i>Chen rossii</i> (<i>Exanthemops rossii</i>)	Ross' Goose	Jeff Davis	Jan 1970
(R. C. Wauer 1973. <i>Birds of the Big Bend National Park and Vicinity</i> . Univ. Texas Press, Austin. This record has been cited in Oberholser (1974), but the date of collection was unknown.)			
<i>Anas strepera</i> (<i>Chaulelasmus streperus</i>)	Gadwall	Lamb	Feb 1978

SPECIES		COUNTY	DATE
<i>Anas cyanoptera</i> (<i>Querquedula cyanoptera</i>)	Cinnamon Teal	Presidio	Jan 1971
<i>Anas clypeata</i> (<i>Spatula clypeata</i>)	Northern Shoveler	Lamb	Feb 1978
<i>Aythya collaris</i> (<i>Perisonetta collaris</i>)	Ring-necked Duck	Presidio	Dec 1970
<i>Aythya valisineria</i> (<i>Aristonetta valisineria</i>)	Canvasback	Lamb	Feb 1978
<i>Aythya affinis</i>	Lesser Scaup	Webb	Mar 1970
<i>Buteo lagopus</i>	Rough-legged Hawk	Presidio	Oct 1971
<i>Aquila chrysaetos</i>	Golden Eagle	Crane	Dec 1967
<i>Colinus virginianus</i>	Bobwhite	Val Verde	Dec 1968
<i>Phasianus colchicus</i>	Ring-necked Pheasant	Castro	Dec 1977
<i>Charadrius alexandrinus</i> (<i>Leucopoliuss alexandrinus</i>)	Snowy Plover	Reeves	Jun 1970
<i>Charadrius semipalmatus</i> (<i>Aegialeus semipalmatus</i>)	Semipalmated Plover	Reeves	Jun 1970
<i>Calidris pusillus</i> (<i>Ereunetes pusillus</i>)	Semipalmated Sandpiper	Ward	Sept 1969
<i>Calidris mauri</i> (<i>Ereunetes mauri</i>)	Western Sandpiper	Presidio	Sept 1970
<i>Micropalama himantopus</i>	Stilt Sandpiper	Reeves	Sept 1970
<i>Sterna albifrons</i> (<i>Sternula albifrons</i>)	Least Tern	Reeves	Jun 1970
		Brooks	Jun 1973
<i>Asio otus</i>	Long-eared Owl	Pecos	Feb 1965
<i>Asio flammeus</i>	Short-eared Owl	Castro	Jan 1978
<i>Stellula calliope</i> (The second specimen for Texas; Gallucci and Scudday, MS in preparation)	Calliope Hummingbird	Hudspeth	Aug 1969
<i>Colaptes auratus luteus</i>	Common (Yellow-shafted) Flicker	Kinney	Jan 1972
<i>Melanerpes formicivorus</i> (<i>Balanosphyra formicivora</i>)	Acorn Woodpecker	Presidio	Mar 1970
<i>Empidonax virescens</i>	Acadian Flycatcher	Wood	Apr 1969
<i>Corvus brachyrhynchos</i>	Common Crow	Floyd	Dec 1977
		Lamb	Feb 1978
<i>Toxostoma curvirostre</i> (<i>Toxostoma curvirostris</i>)	Curve-billed Thrasher	Oldham	Jun 1974
<i>Vireo olivaceus</i> (<i>Vireosylva virescens</i>)	Red-eyed Vireo	Wood	Apr 1969
<i>Oporornis formosus</i>	Kentucky Warbler	Presidio	Apr 1973
<i>Molothrus aeneus</i> (<i>Tangavius aeneus</i>)	Bronzed Cowbird	Presidio	Jun 1977

County Records in Texas for Birds Housed in The Museum, Texas Tech University

Robert C. Dowler, David K. Dean, Thomas E. Herman, and Alan C. Simon

Museum of the High Plains, Fort Hays State University, Hays, Kansas 67601 (Dowler), The Museum, Texas Tech University, Lubbock, Texas 79409 (Dean and Simon), and Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213 (Herman)

Barr et al. (1975, Bull. Texas Ornith. Soc. 8:8–10) supplemented distributional records published by Oberholser (1974, *The Bird Life of Texas*, Univ. Texas Press, Austin) based on specimens housed in the Texas Cooperative Wildlife Collection, Texas A&M University. The authors suggested that persons at other institutions compile similar lists to further update knowledge of the Texas avifauna. This list is a compilation of specimens in the ornithological collection at The Museum, Texas Tech University, for which no county records are reported in either of the above publications. Specimens previously reported by Bjelland and Menaul (1976, Bull. Texas Ornith. Soc. 9:4–5) have not been included.

Arrangement and scientific nomenclature follows the A. O. U. "Check-list of North American birds" (1957, 5th edition) and supplements (1973, Auk 90:411–419; 1976, Auk 93:875–879). Nomenclature used by Oberholser (1974), where different, is given in parentheses, as in Barr et al. (1975).

In addition to the 135 specimens listed below for which no county records previously have been reported, 193 specimens of 89 species in the collection verify sight records and were collected in seasons other than those represented on range maps published by Oberholser.

SPECIES	COUNTY	DATE
<i>Anhinga anhinga</i> Anhinga	Hays	Aug 1931
<i>Ardea herodias</i> Great Blue Heron	Motley	Sep 1977
<i>Butorides striatus</i> (<i>B. virescens</i>) Green Heron	Motley	Sep 1977
<i>Bubulcus ibis</i> Cattle Egret	Crosby	Nov 1974
<i>Nycticorax nycticorax</i> Black-crowned Night Heron	Crosby	Nov 1975
<i>Nycticorax nycticorax</i> Black-crowned Night Heron	Lubbock	Spring 1954
<i>Ixobrychus exilis</i> Least Bittern	Lubbock	Oct 1973
<i>Botaurus lentiginosus</i> American Bittern	Motley	Sep 1977
<i>Plegadis chihi</i> (<i>P. mexicanus</i>) White-faced Ibis	Lubbock	Sep 1977
<i>Chen rossii</i> (<i>Exanthemops rossi</i>) Ross Goose	Castro	Dec 1977
<i>Anas platyrhynchos</i> (<i>A. platyrhyncha</i>) Mallard	Garza	Dec 1969
<i>Anas strepera</i> (<i>Chaulelasmus streperus</i>) Gadwall	Garza	Dec 1974
<i>Anas acuta</i> (<i>Dafila acuta</i>) Pintail	Garza	Dec 1969
<i>Anas crecca carolinensis</i> (<i>Nettion carolinense</i>) Green-winged Teal	Crosby	Nov 1974
<i>Anas cyanoptera</i> (<i>Querquedula cyanoptera</i>) Cinnamon Teal	Castro	Dec 1975

SPECIES	COUNTY	DATE
<i>Anas americana</i> (<i>Mareca americana</i>) American Wigeon	Garza	Dec 1974
<i>Anas americana</i> (<i>Mareca americana</i>) American Wigeon	Lubbock	Sep 1966
<i>Anas clypeata</i> (<i>Spatula clypeata</i>) Northern Shoveler	Crosby	Nov 1974
<i>Anas clypeata</i> (<i>Spatula clypeata</i>) Northern Shoveler	Hockley	Sep 1975
<i>Anas clypeata</i> (<i>Spatula clypeata</i>) Northern Shoveler	Lamb	Jan 1976
<i>Aythya americana</i> (<i>Nyroca americana</i>) Redhead	Carson	Nov 1958
<i>Aythya collaris</i> (<i>Perissonetta collaris</i>) Ring-necked Duck	Garza	Dec 1974
<i>Aythya collaris</i> (<i>Perissonetta collaris</i>) Ring-necked Duck	Hale	Nov 1975
<i>Bucephala clangula</i> (<i>Glaucionetta clangula</i>) Common Goldeneye	Castro	Jan 1976
<i>Bucephala clangula</i> (<i>Glaucionetta clangula</i>) Common Goldeneye	Lubbock	Feb 1975
<i>Bucephala albeola</i> Bufflehead	Garza	Dec 1969
<i>Bucephala albeola</i> Bufflehead	Hockley	Nov 1975
<i>Bucephala albeola</i> Bufflehead	Lubbock	Jan 1974
<i>Oxyura jamaicensis</i> Ruddy Duck	Hockley	Nov 1975
<i>Coragyps atratus</i> Black Vulture	Lubbock	May 1975
<i>Ictinia mississippiensis</i> (<i>I. mississippiensis</i>) Mississippi Kite	Clay	Spring 1954
<i>Accipiter striatus</i> Sharp-shinned Hawk	Lamb	Dec 1968
<i>Accipiter striatus</i> Sharp-shinned Hawk	Motley	Sep 1977
<i>Accipiter cooperii</i> Cooper's Hawk	Terry	Feb 1976
<i>Buteo jamaicensis</i> Red-tailed Hawk	Yoakum	Oct 1975
<i>Buteo swainsoni</i> (<i>Craxirex swainsoni</i>) Swainson's Hawk	Jim Wells	Apr 1958
<i>Circus cyaneus</i> Marsh Hawk	Hale	Nov 1969
<i>Circus cyaneus</i> Marsh Hawk	Lamb	Aug 1958
<i>Circus cyaneus</i> Marsh Hawk	Lubbock	Oct 1977
<i>Pandion haliaetus</i> Osprey	Live Oak	No Date
<i>Falco columbarius</i> (<i>Aesalon columbarius</i>) Merlin	Garza	Oct 1950
<i>Falco sparverius</i> (<i>Tinnunculus sparverius</i>) American Kestrel	Swisher	Dec 1969
<i>Colinus virginianus</i> Bobwhite	Hopkins	Dec 1941
<i>Callipepla squamata</i> Scaled Quail	Swisher	Nov 1969
<i>Callipepla squamata</i> Scaled Quail	Winkler	Nov 1977
<i>Grus canadensis</i> Sandhill Crane	Lubbock	Nov 1973
<i>Porzana carolina</i> Sora	Cochran	May 1967
<i>Porzana carolina</i> Sora	Lubbock	No Date
<i>Porzana carolina</i> Sora	Motley	Sep 1977
<i>Gallinula chloropus</i> Common Gallinule	Jim Wells	May 1960
<i>Charadrius vociferus</i> (<i>Oxyechus vociferus</i>) Killdeer	Winkler	Jun 1966

SPECIES	COUNTY	DATE
<i>Capella gallinago</i> Common Snipe	Crosby	May 1976
<i>Numenius americanus</i> Long-billed Curlew	Coke	May 1967
<i>Actitis macularia</i> Spotted Sandpiper	Hopkins	May 1939
<i>Actitis macularia</i> Spotted Sandpiper	Jim Wells	Aug 1959
<i>Tringa solitaria</i> Solitary Sandpiper	Hays	May 1935
<i>Tringa melanoleuca</i> (<i>Glottis melanoleuca</i>) Greater Yellowlegs	Cottle	Apr 1957
<i>Tringa flavipes</i> (<i>Totanus flavipes</i>) Lesser Yellowlegs	Motley	Sep 1977
<i>Calidris minutilla</i> (<i>Pisobia minutilla</i>) Least Sandpiper	Crosby	Sep 1975
<i>Calidris pusilla</i> (<i>Ereunetes pusillus</i>) Semipalmated Sandpiper	Crosby	Oct 1975
<i>Limnodromus scolopaceus</i> (<i>L. griseus</i>) Long-billed Dowitcher	Crosby	Nov 1975
<i>Micropalama himantopus</i> Stilt Sandpiper	Lubbock	Sep 1975
<i>Steganopus tricolor</i> Wilson's Phalarope	Lamb	Apr 1957
<i>Scardafella inca</i> Inca Dove	Lubbock	Jul 1975
<i>Coccyzus erythrophthalmus</i> Black-billed Cuckoo	Lubbock	Sep 1974
<i>Geococcyx californianus</i> Roadrunner	Garza	Jul 1951
<i>Tyto alba</i> Barn Owl	Hockley	May 1974
<i>Tyto alba</i> Barn Owl	Jones	Dec 1968
<i>Tyto alba</i> Barn Owl	Parmer	Sep 1975
<i>Tyto alba</i> Barn Owl	Swisher	Dec 1975
<i>Athene cunicularia</i> (<i>Speotyto cunicularia</i>) Burrowing Owl	Crosby	Oct 1974
<i>Asio otus</i> Long-eared Owl	Lamb	Sep 1958
<i>Asio otus</i> Long-eared Owl	Lubbock	Dec 1974
<i>Asio flammeus</i> Short-eared Owl	Carson	Mar 1975
<i>Asio flammeus</i> Short-eared Owl	Crosby	Jan 1978
<i>Asio flammeus</i> Short-eared Owl	Hale	Dec 1969
<i>Asio flammeus</i> Short-eared Owl	Lubbock	Dec 1973
<i>Caprimulgus carolinensis</i> (<i>Antrastomus carolinensis</i>) Chuck-will's-widow	Zapata	May 1962
<i>Archilochus alexandri</i> Black-chinned Hummingbird	Kimble	May 1975
<i>Colaptes auratus</i> Common Flicker	Jim Wells	Dec 1958
<i>Colaptes auratus</i> Common Flicker	Motley	Nov 1975
<i>Colaptes auratus</i> Common Flicker	Lamb	Dec 1968
<i>Colaptes auratus</i> (<i>C. cafer</i>) Common Flicker	Winkler	Nov 1977
<i>Colaptes auratus</i> (<i>C. cafer</i> × <i>C. auratus</i>) Common Flicker	Hale	Dec 1969
<i>Muscivora forficata</i> Scissor-tailed Flycatcher	Jim Wells	1957
<i>Nuttallornis borealis</i> Olive-sided Flycatcher	Motley	Sep 1977
<i>Iridoprocne bicolor</i> Tree Swallow	Lubbock	Mar 1974
<i>Riparia riparia</i> Bank Swallow	Lubbock	Sep 1954
<i>Corvus brachyrhynchos</i> Common Crow	Garza	Mar 1957
<i>Auriparus flaviceps</i> Verdin	Randall	Sep 1950
<i>Auriparus flaviceps</i> Verdin	Winkler	Nov 1977

SPECIES	COUNTY	DATE
<i>Thryomanes bewickii</i> Bewick's Wren	Motley	Sep 1977
<i>Thryomanes bewickii</i> Bewick's Wren	Winkler	Nov 1977
<i>Cistothorus palustris</i> (<i>Telmatodytes palustris</i>) Long-billed Marsh Wren	Motley	Sep 1977
<i>Catherpes mexicanus</i> Canyon Wren	Swisher	Nov 1969
<i>Salpinctes obsoletus</i> Rock Wren	Garza	Mar 1957
<i>Salpinctes obsoletus</i> Rock Wren	Hockley	Sep 1974
<i>Salpinctes obsoletus</i> Rock Wren	Swisher	Nov 1969
<i>Toxostoma rufum</i> (<i>T. rufa</i>) Brown Thrasher	Motley	Sep 1977
<i>Toxostoma dorsale</i> Crissal Thrasher	Winkler	Nov 1977
<i>Turdus migratorius</i> American Robin	Motley	Apr 1977
<i>Catharus ustulatus</i> (<i>Hylocichla ustulata</i>) Swainson's Thrush	Lubbock	May 1972
<i>Sialia sialis</i> Eastern Bluebird	Lubbock	Feb 1974
<i>Sialia currucoides</i> Mountain Bluebird	Lubbock	Oct 1950
<i>Bombycilla cedrorum</i> Cedar Waxwing	Lubbock	Oct 1950
<i>Bombycilla cedrorum</i> Cedar Waxwing	Wharton	Dec 1967
<i>Vireo philadelphicus</i> (<i>Vireosylva philadelphica</i>) Philadelphia Vireo	Motley	Sep 1977
<i>Dendroica coronata</i> (<i>D. auduboni</i>) Yellow-rumped Warbler	Lamb	May 1959
<i>Oporornis tolmiei</i> MacGillivray's Warbler	Lamb	May 1959
<i>Oporornis tolmiei</i> MacGillivray's Warbler	Lubbock	May 1975
<i>Icteria virens</i> Yellow-breasted Chat	Kimble	May 1976
<i>Wilsonia pusilla</i> Wilson's Warbler	Lubbock	Apr 1975
<i>Icterus galbula</i> Northern Oriole	Clay	May 1954
<i>Icterus galbula</i> (<i>I. bullockii</i>) Northern Oriole	Kerr	Jun 1957
<i>Quiscalus quiscula</i> (<i>Q. aenus</i>) Common Grackle	Hopkins	Nov 1939
<i>Cardinalis sinuatus</i> (<i>Pyrrhuloxia sinuata</i>) Pyrrhuloxia	Crosby	Mar 1967
<i>Cardinalis sinuatus</i> (<i>Pyrrhuloxia sinuata</i>) Pyrrhuloxia	Lubbock	Mar 1974
<i>Passerina ciris</i> (<i>Linaria ciris</i>) Painted Bunting	Motley	Sep 1977
<i>Carduelis pinus</i> (<i>Spinus pinus</i>) Pine Siskin	Lubbock	Feb 1976
<i>Carduelis tristis</i> (<i>Spinus tristis</i>) American Goldfinch	Sutton	Apr 1957
<i>Carduelis psaltria</i> (<i>Spinus psaltria</i>) Lesser Goldfinch	Lubbock	Nov 1950
<i>Pipilo fuscus</i> Brown Towhee	Winkler	Sep 1975
<i>Passerculus sandwichensis</i> Savannah Sparrow	Crosby	Nov 1974
<i>Ammodramus savannarum</i> Grasshopper Sparrow	Lubbock	Sep 1974
<i>Ammodramus savannarum</i> Grasshopper Sparrow	Winkler	Sep 1975
<i>Pooecetes gramineus</i> Vesper Sparrow	Lubbock	May 1975
<i>Aimophila cassinii</i> Cassin's Sparrow	Winkler	Sep 1975
<i>Amphispiza bilineata</i> Black-throated Sparrow	Winkler	Nov 1977
<i>Amphispiza belli</i> Sage Sparrow	Winkler	Nov 1977
<i>Junco hyemalis</i> (<i>J. oreganus</i>) Dark-eyed Junco	Taylor	Nov 1975
<i>Spizella passerina</i> Chipping Sparrow	Crosby	Oct 1975

SPECIES	COUNTY	DATE
<i>Spizella pallida</i> Clay-colored Sparrow	Lubbock	May 1975
<i>Zonotrichia albicollis</i> (<i>Z. pensylvanica</i>) White-throated Sparrow	Lubbock	Nov 1977
<i>Melospiza lincolnii</i> Lincoln's Sparrow	Terry	Apr 1976
<i>Calcarius ornatus</i> Chestnut-collared Longspur	Crosby	Jan 1978



Nesting Great Egrets and a Snowy Egret on Sidney Island, Texas. Photo by R. D. Slack.

Breeding Success of Great Egrets on a Dredged Material Island in Texas

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This note describes the breeding success of Great Egrets (*Casmerodius albus*) that nested on Sidney Island, Sabine Lake, Texas, during 1977. Sidney is a 13 ha dredged material and island dominated by *Phragmites communis*; several species of shrubs and trees are scattered among the *Phragmites*. About 1000 pr of Great Egrets nested on Sidney in 1977, along with Snowy Egrets (*Egretta thula*), Cattle Egrets (*Bubulcus ibis*), Louisiana Herons (*Hydranassa tricolor*), Little Blue Herons (*Florida caerulea*), Black-crowned Night Herons (*Nycticorax nycticorax*), White Ibis (*Eudocimus albus*), White-faced Ibis (*Plegadis chihi*), Roseate Spoonbills (*Ajaia ajaja*), and Olivaceous Cormorants (*Phalacrocorax olivaceus*). Great Egret nests were marked with colored tape during the egg-laying state. Nests were visited every 5 days from 1 April to 1 June, at which time young were able to escape from nests at our approach.

Nest site selection began 14 March, while nest construction commenced about 23 March. During this study all nests were placed close together in the tops of low shrubs (*Sambucus canadensis* and *Iva frutescens*; $\bar{x}$ = 0.98 m, range = 0.6–1.6 m). Trees have been used for nesting by Great Egrets (Pratt 1972), and were scattered about on Sidney Island. The dispersed distribution of trees may have contributed to their lack of use as nesting sites by the usually gregarious egrets.

Clutch size averaged 2.3 eggs per nest (range = 1–3). Clutch size was thus lower than the clutches of 3 to 4 eggs previously reported for Great Egrets (Bent 1926, Simmons 1959, Palmer 1962, Pratt 1972, Maxwell and Kale 1977). As ponds used for feeding by egrets were flooded during 1977, foraging difficulties prior to breeding could have been experienced by the egrets. Kushlan (1976) showed that feeding success of wading birds was inversely related to water depth. Great Egrets could have laid smaller clutches as a result of poor relative feeding success, as evidenced for various bird species by Lack (1954).

Incubation period ranged from 23 to 27 days. Bent (1926) gave an incubation period of 23 or 24 days, while Maxwell and Kale (1977) listed a period of 26 days for Great Egrets.

The standard calculations of breeding success are presented in Table 1. All measures of success were similar to those found for Great Egrets in Georgia by Teal (1965) and in California by Pratt (1972). The possible clutch size reduction (and thus fewer young per nest) by egrets in this study may have allowed adults to adequately feed smaller broods, accounting for similar success values between studies.

Hatching failure of 7% was apparently due to infertility or embryonic death. Hatching failures of 3% to 13% have been previously reported (Teal 1965, Pratt 1972). As nests were only visited every 5 days, exact causes of nesting mortality were difficult to determine. Greatest egg loss (about 50%) was likely due to storms

Table 1. Breeding success of Great Egrets on Sidney Island, Texas, during 1977.

	Clutch size			Total
	1	2	3	
No. of nests	2	17	13	32
No. of eggs	2	34	39	75
No. hatched	1	20	19	40
% hatched	50.0	58.8	48.7	53.3
Hatch/nest	0.5	1.18	1.46	1.25
No. fledged	0	14	12	26
% fledged ¹	0	70.0	63.2	65.0
Fledged/nest	0	0.82	0.92	0.81
% nest success ²	0.0	47.1	53.8	46.8

¹ From eggs that hatched.

² Successful if at least 1 young fledged.

which blew eggs from nests. Boat-tailed Grackles (*Cassidix major*) were observed destroying eggs in unmarked Great Egret nests during our visits to the colony. Two eggs in different nests were crushed as adults jumped from nests at our approach. Pratt (1972) felt that breakage in the nest accounted for a substantial proportion of egg loss in a Great Egret colony in California.

Seventy-two percent of young mortality occurred during the first 10 days after hatching. As a result of possible poor feeding conditions, the smallest member of a brood died soon after hatching. Roughly 50% of young mortality was due to starvation and/or trampling, while another 50% was due to storms. No young died after 20 days in the nest. Pratt (1970) showed that the highest level of Great Egret nestling mortality was due to competition for food by young during the first 3 weeks after birth. After 3 weeks of age, egrets can climb back into nests after dislodgement during storms and human disturbance.

We are grateful to R. D. Slack for advice and encouragement during all phases of the study. Mrs. S. Bailey, National Audubon Society warden, is thanked for permission to conduct the study on Sidney Island. MLM was supported by a Research Fellowship from the Rob and Bessie Welder Wildlife Foundation, and acknowledges their support.

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GENERAL NOTES

Lesser Scaup Collides With Fence in South Texas

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A female Lesser Scaup (*Aythya affinis*) was found at 0800 on 30 November 1977, impaled on a barbed wire fence stretched across a 0.20-ha man-made pond on the Welder Wildlife Foundation near Sinton, Texas. The bird was impaled on a single barb of the top strand of wire 88 cm above the water. Blood on the wire indicated a struggle by the bird to free itself. The weather on the day preceding the discovery (assumed to be the day when the incident occurred) was overcast and rainy, with a strong northerly wind. The fence divides the pond in half and is the dominant surface feature. Lesser Scaups and Ring-necked Ducks (*A. collaris*) are commonly seen on the pond.

Waterfowl losses caused by collisions with fences, power and communication lines may occur more commonly than supposed (Cornwell and Hochbaum 1971, Wilson Bull. 83:305–306). Incidents of puddle ducks striking fences and being unable to free themselves have been recorded. Cornwell and Hochbaum (op. cit.) reported a fully grown, juvenile female Pintail (*Anas acuta*) and an adult drake Blue-winged Teal (*A. discors*) impaled on wire fences; both birds struck a single barb on the top strand. These incidents are similar to the accidental death of the female Lesser Scaup reported here; however, there have been no previous published reports of a diving duck becoming impaled on a barbed wire fence.

Late Nesting of Ruddy Duck in Northwest Texas

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On 14 September 1977 at approximately 0900, Daylight Savings Time, I observed two Ruddy Duck broods (*Oxyura jamaicensis*) on a playa lake, 7.83 kilometers east of Hart, Texas on FM Road 1056, in Castro County.

One brood had seven ducklings and the other had eight. They continuously dove and surfaced in submergent plants in an attempt to escape me. I observed three to four individuals at a distance <1 m and readily identified them as downy Ruddy Ducks by their characteristically short, broad bills and black and white facial markings.

I estimated both the broods' ages at 1 week, based on their size, downy feathers and still distinct markings (Gollop and Marshall 1954). I had visited the lake on 8 September 1977 and observed no Ruddy broods.

The broods were on a regionally typical playa of about 10 ha; maximum depth was 0.75 m. Scattered stands of hardstem bulrush (*Scirpus acutus*) probably provided nesting sites, which, according to Low (1941) and Williams and Marshall (1939), are preferred nesting cover of Ruddy Ducks. Lush growths of sago pondweed (*Potamogeton pectinatus*), broadleaved pondweed (*P. natans*) and muskgrass (*Chara* sp.) probably harbored sufficient invertebrate populations for an adequate food source.

I believe this is the latest observation of Ruddy Duck broods in Texas. Oberholser (1974) reports broods as late as August at San Perlite, Texas and a brood seen repeatedly from August to September at Anahuac National Wildlife Refuge, Texas.

Sutton (1967) does not mention brooding Ruddy Ducks in Oklahoma past July. Bailey (1965) noted a brood on 9 August 1957 in Colorado, but did not mention the age of the brood. Late broods have, however, been observed in New Mexico (Bailey 1928); downy ruddy ducklings were observed on 17 and 27 September 1904, at La Jara Lake, Rio Arriba County, but no mention was made of their stage of development.

Acknowledgements

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Texas Organization for Endangered Species

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On 5 April 1972, the Texas Organization for Endangered Species (TOES) was formed to study the plight of vanishing plants and animals in Texas, and to

educate the public about the conservation of these organisms. Since that time, some 450 interested persons, including biologists, plant scientists, conservationists, educators, and natural resource managers have banded together in a cooperative effort to more fully understand those factors which contribute to the endangerment of native plants and animals of Texas.

The objectives of TOES are: recognizing and developing watchlists of threatened and endangered species; developing for such species a description of habitat needs and measures to protect and preserve them; developing monitoring systems to maintain a watch on endangered species; and developing and disseminating informational material on rare, threatened, or endangered species.

The Texas Organization for Endangered Species is divided into two working committees—plants and animals. The organization is governed by a steering committee composed of a president, president-elect, secretary-treasurer, corresponding secretary, chairman and vice-chairman of each of the two committees, the three most recent past presidents, and three members at large selected by elected members of the committee.

There are no “dues.” Membership is open to any individual or organization interested in the protection and conservation of threatened species. Membership can be obtained by attending the annual meeting held each spring or by sending in a \$3.00 registration fee charged to all participants. Membership must be renewed annually. Our address is TOES, Box 12773, Austin, TX 78711.

Bolstered by Public Law 93-205 entitled the “Endangered Species Act of 1973,” TOES set out to determine which species throughout the state were, in fact, threatened or endangered. By April 1975, TOES published a watchlist of Endangered, Threatened, and Peripheral Vertebrates of Texas (copies can be obtained for \$1.00 by writing TOES). Since that time, considerable work has been undertaken by the animal committee to update this list. This committee is now broken down into five subcommittees. These include Mammals, Birds, “Herptiles,” Fish, and Invertebrates. Each of these subcommittees, using a modified prioritizing system developed by the Texas Parks and Wildlife Department, maintains a continuing re-evaluation process to determine which species should be classified as endangered and what action should be taken to protect and preserve the species.

Several watchlists for plants have been published by TOES during the past five years. None of these, however, represent an authoritative listing of plants critically endangered. The current list which TOES endorses is one gleaned from the proposed endangered plant list published in the *Federal Register* June 16, 1976. In addition, the 3rd edition of the UT Rare Plant Study Center’s “Rare and Endangered Plants Native to Texas” has been adopted as a general informational pool on Texas’ unique floral resources.

Within the past year the Plant Committee has taken positive steps to establish criteria by which all its members could agree to use in determining which plant species must be recognized as endangered. After considerable discussion, the Sparrowe-Wight Rating System was determined most promising. A seven member subcommittee was appointed to adapt this system for use in Texas. This new criteria is currently being tested for applicability by plant committee members.

The Sparrowe-Wight System is based on a 100 point system. It provides a numerical rating based on an assessment of the imminence of the threat to a species’ continued existence. It is based primarily on the biology of the plant and

the security of its habitat. Eventually it is Planned for TOES to have its qualified members and other selected scientists provide a current list of endangered plants that have been evaluated with this revised system.

The classification of plants and animals as to the hazards to their continued existence and current individual status of endangerment will continue to be controversial. It is the goal of TOES to look through this maze continually considering constructive suggestions and periodically updating its lists as new information is received.

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Post-breeding Movements of Purple Martins in the Lake Texoma Area

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At about 1600 on 25 July 1975 while birding on the Preston Peninsula, Grayson County, Texas, in Lake Texoma, we noted many Purple Martins (*Progne subis*) moving northward over the peninsula. We moved to a location near the northernmost tip of the peninsula which provided a good view of the lake and observed at least 400 martins moving north across the lake. With a 30× scope we saw that the martins were moving up the Washita Arm of the lake, which was barely visible to us from the peninsula. By 1800 all of the martins had disappeared.

Recognizing the possibility of a pre-migratory Purple Martin roost in the area, during 1400–1800 on 26 July 1975 we searched the Washita Arm area from near Kingston, Oklahoma, to near Tishomingo, Oklahoma. We noticed martins moving over the lake but saw nothing to indicate a roost in the area. Several small (“staging”?) flocks of 25–40 martins were perched on television aerials in the area. We did see several martins flying at dusk near U. S. Highway 70 on the Roosevelt Memorial Bridge, but no roost was seen there. These martins may have been from an alleged martin roost at the Lake Texoma Lodge near Kingston which was later reported to us by a lodge-member. The only documented Purple Martin roost in the region was a well-established one at Tishomingo National Wildlife Refuge, which is about 48 km north of the Preston Peninsula.

On 27 July 1975 Donald E. Berger found a dead juvenile martin near Mead in Bryan County, Oklahoma. It had died after striking a radio tower. This martin had been banded by us in Sherman, Grayson County, north central Texas, on 9 June 1975 when it was about 2 weeks old. Sherman is about 45 km south of Mead.

At 1800 on 27 July 1976 we visited the Tishomingo roost. The roost had increased to about 15,000 martins since we had last visited it at 1800 on 31 July

1974, at which time it contained 3,000 birds. Assistant Tishomingo Refuge manager Bill Hawthorne reported to us in 1974 that the normal size of the roost was about 3,000 martins; the increase in 1976 was unexplainable.

We located one banded female martin at Tishomingo Refuge on 27 July 1976, and with a 30× scope Brown easily read the band number while the bird sat on a wire. The martin had been banded as a nestling in Sherman on 30 May 1975. We located another banded martin that appeared to be a juvenile, and Brown read a portion of its band number. The portion read corresponded to band numbers used on nestling Purple Martins in Sherman in the 1976 season. On this same day we also saw several more banded martins at the roost whose band numbers we were unable to read. Sherman is about 80 km south of the Tishomingo roost.

On 8 August 1977 Brown visited the Tishomingo roost and sighted at least 3 color-banded juvenile Purple Martins among the birds there. These were color-banded martins that had been marked in Sherman as nestlings during the 1977 season. The martin roost at Tishomingo on 8 August 1977 contained about 3,000 birds.

Although pre-migratory roosting behavior of the Purple Martin is well documented (Deusing 1942, Passenger Pigeon 4:17–21; Cater 1944, Condor 46:15–18; and Allen and Nice 1952, Amer. Midl. Nat. 47:606–665), heretofore there seem to be no references on directional movements and dispersal of martins after breeding. It appears, based on our observations and banding records from 1975, 1976, and 1977, that many Purple Martins, including juveniles, from Grayson County, Texas, disperse northward into south central Oklahoma after breeding for pre-migratory roosting and assembling. One large martin roost is located at Tishomingo Refuge, and a possible one is located near Kingston, Oklahoma. No observations at this time support the presence of a third roost in the area. The observations on Preston Peninsula suggest that Purple Martins may move as far as 48 km from the roosts during the day while feeding.

Interspecific Aggression Between a Carolina Chickadee and a Downy Woodpecker

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At 1430 on 8 November 1975 on the Texas A&M University campus at College Station, Texas, we observed a male Downy Woodpecker (*Dendrocopus pubescens*) alight just below a hole on a large Live Oak (*Quercus virginiana*) limb. The hole, apparently excavated by a woodpecker, was located about 5 m from the main trunk and 4 m above the ground. Sounds were heard from within the hole as the woodpecker put his bill into the hole. Suddenly, a Carolina Chickadee (*Parus carolinensis*) emerged and both birds, fighting furiously, tumbled to the ground and then separated. We could not determine whether the woodpecker

pulled the chickadee from the hole or the chickadee attacked the woodpecker to initiate the skirmish. The woodpecker flew to a different oak limb about 5 m from, but at the same level as the hole. The chickadee quickly followed and the two engaged and plunged to the ground again. Then the woodpecker flew to an oak limb about 4 m high and 6 m from the hole. The chickadee followed and, rather than physically resuming the attack, began "chattering" at the woodpecker from a distance of about 50 cm. Within a few seconds it was joined in this chatter by two other chickadees and an unidentified warbler. Apparently not bothered by the chatter, the woodpecker remained on the limb for about 30 seconds before flying from the immediate area. The other birds did not follow.

The total time for both physical encounters was no more than 5 seconds. This day and the preceding two days were generally clear and cool with temperatures ranging from 12° to 28°C, with winds to 15 knots (18 mph) on 8 November. No birds were observed using the hole during the following month and the limb has since been pruned from the tree.

Lawrence (1966) observed a Downy Woodpecker which successfully defended its nest against a Great Crested Flycatcher (*Myiarchus crinitus*), and then became the object of mobbing actions by the neighboring vireos and warblers. Alexander Wilson (Bent 1939) described a House Wren (*Troglodytes aedon*) that displaced a pair of Downy Woodpeckers from their nest hole during the breeding season. The use of old woodpecker holes or natural cavities for nests by chickadees is not unusual (Bent 1946), nor is their aggressive nature (Brewer 1961). Such behavior has been reported for the Gray-headed Chickadee (*Parus cinctus*) which has been known to eject woodpeckers from their nest hole and occupy it (Wetmore 1964).

It is not unusual for members of the genus *Parus* to utilize winter roost holes. The Great Tit (*Parus major*) roosts in holes in the winter and in foliage in the summer (Hinde 1952). Titmice will also often roost in holes for shelter and warmth (Wetmore 1964). Carolina Chickadees have been known to use woodpecker holes as early as February in Oklahoma (Sutton 1977). The windy and cool conditions, sparse foliage, and absence of chickadee sightings prior to the woodpecker encounter suggest that the chickadee was using the hole as a roost for shelter and warmth. Although our discussion assumes that chickadees may utilize roost holes, the use or non-use of roost holes by chickadees in Texas needs further research.

Mobbing is defined by Hartley (1950) as a "demonstration made by a bird against a potential or supposed enemy belonging to another and more powerful species, it is initiated by the member of the weaker species, and is not a reaction to an attack upon the person, mate, nest, eggs, or young." Mobbing activity, which usually involves several individuals, tends to make a predator move elsewhere, thus reducing the danger to participating birds and their territory (Culley and Ligon 1976). In our observation, the mobbing of a slightly larger bird might have served to insure the availability of a favored roosting site.

While the Downy Woodpecker frequently associates with Carolina Chickadees in interspecific feeding parties (Brewer 1961), resource competition between the two species might alter this association. The scarcity of winter roost holes and their utilization by both the Carolina Chickadee and the Downy Woodpecker provide an arena of potential resource competition. If the Carolina Chickadee is

the more aggressive and is able to elicit mobbing activity against the Downy Woodpecker, then it may be able to out-compete the larger bird for specific seasonal resources, such as winter roost holes. Also, assuming that aggressive behavior may be seasonally variable, as is territorial behavior, the Carolina Chickadee might even be aggressive enough to displace the Downy Woodpecker during the nesting season under certain conditions.

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Juvenile Purple Martins: Field Identification and Post-fledging Nest Defense

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Discussions of field identification of Purple Martins (*Progne subis*) have been confined largely to adults and first-year breeders (e.g. Peterson 1960, Chapman 1939, and Robbins et al. 1966), while other texts have concerned only laboratory identification (e.g. Niles 1972). Little or no mention has been made of field identification of juvenile martins. "Juvenile" is understood here to be a young bird after fledging and before migrating south its first time.

While studying Purple Martins in Sherman, Grayson County, north central Texas in 1969–77, I noted certain plumage characters that could be used to identify (i.e. age) juvenile martins in the field. Juvenile Purple Martins are commonly seen in north central Texas from early June when the first broods fledge until early to mid-August when martins largely gather in pre-migratory roosts.

Throughout their time in Sherman, juvenile Purple Martins are easily aged in the field by a thin, light gray border on the otherwise dark brown primary and

secondary remiges, noticeable only when the bird is perched and the folded wing is seen. The light gray border contours the middle and inner primaries and outer secondaries and is quite distinct. As the juveniles become older, they often can be aged in the field only by this gray border, which they possess in its entirety until their departure in the fall. Adults and first-year breeders do not show the gray border. This character has received no mention in the literature regarding field identification of Purple Martins.

Depending on the length of time the individual has been out of the nest, juveniles can also be aged by a slightly smaller overall size, less forked (more rounded) tail, extensive white flecking on the fore-edge of the shoulder, and remnants of yellow or white along the edges of the mouth. It is difficult to sex juveniles in the field, although by early August in Sherman some juvenile male Purple Martins begin to show traces of purple feathering about the neck and head.

Earlier Brown (1978) noted that juvenile Purple Martins, after attaining independence from their parents, do not defend nest cavities. However, further work has necessitated a reversal of that statement. I had never observed nest defense by juvenile martins until early August 1977, nor had any previous researchers reported nest defense in juvenile Purple Martins (Bent 1942, Allen and Nice 1952, Johnston and Hardy 1962, Finlay 1971).

In 1977 Sam D. Wolfe and I banded nestling martins with colored celluloid bands at various martin colonies in Sherman. Some of these banded birds were used later in observations on post-fledging nest defense, although I also could identify independent juveniles by the plumage characters mentioned above.

In 1977 I conducted observations at a 42-room, first-year martin colony in Sherman. In late July and early August small bands of martins visited the colony each morning. These bands were comprised of 20–30 martins; occasionally at least 50 birds were present. They sat on the wires and preened and often visited the martin houses, behavior that was described earlier (Brown 1978). Adults, first-year breeders (i.e. subadults), and juveniles were present. No exact counts were made, but males greatly outnumbered females. Many of the juveniles had started showing purple feathering around the neck and head. Several of the adult and subadult males defended nest cavities; post-breeding nest defense by adults and yearlings is common in Sherman, having also been noted by Finlay (1971) in Alberta, Canada.

On 30 July 1977 I noticed three color-banded juvenile male Purple Martins investigating one side of a 12-room aluminum martin house. Each of the juveniles entered a room and sat in the entrance, defending the room by lunges at intruders. Two of the juveniles showed much purple feathering; the third individual had few purple feathers and apparently was younger than the former two. During the period 30 July–8 August, these three individuals returned to the colony each morning and defended their respective rooms. They successfully repelled adult and subadult males that trespassed onto the porch in front of their rooms, although no fights occurred. Few females appeared, but when a juvenile female visited the martin house on 1 August, the juvenile males became excited and gave subdued songs and rapidly entered their respective rooms. Three unmarked juvenile males also defended rooms in a 6-room aluminum martin house during 30 July–8 August. All nest defense activity ceased by noon each day, and no martins appeared in the afternoon.

These juvenile martins that engaged in nest defense probably had been out of the nest no more than 6-7 weeks. Other forms of premature sexual behavior have been noted for recently-fledged Purple Martins (Brown 1978). Peterson (1955) observed juvenile Bank Swallows (*Riparia riparia*) digging nest burrows during the post-nesting phase, and Myers and Waller (1977) report juvenile Barn Swallows (*Hirundo rustica*) helping to feed later broods. Post-fledging nest defense in juvenile Purple Martins may serve two functions: (1)—imprint the location of future nest sites, as Finlay (1971) and Brown (1978) suggested for adult and subadult martins, and (2)—attune the juveniles to aspects of nesting behavior which will be used the following spring. The latter may be present for all hirundinids in which juveniles display abortive nesting behavior after fledging.

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HAWK WATCH.—The Hawk Migration Association of North America announces the fall Gulf coast hawk watch for October 7. Information and forms for the watch can be obtained from David E. Wolf, 801 Martinsville Street, Nacogdoches, Texas 75961.

NOTES AND NEWS

ABOUT THE ARTIST.—The illustration of a nesting pair of Great Blue Herons (inside front cover) is an original pencil drawing by Chester O. Martin. Martin holds B.S. and M.S. degrees in Wildlife and Fisheries Sciences from Texas A&M University and is currently employed as a Wildlife Biologist with the U. S. Army Corps of Engineers. Martin has provided over 200 drawings and paintings for approximately 25 technical publications, magazines, journal covers, and books. Major contributions include a series of paintings for Texas Parks and Wildlife Magazine (reproduced in *Mammals of Texas* [1974] by W. B. Davis) and 75 plates of approximately 100 species for *The Mammals of Trans-Pecos Texas* by D. J. Schmidly (1977). He free-lances along the Texas Coast where he is presently concentrating on watercolors of wildlife, "shore-scapes," and natural landscapes. Martin, his wife Shirley, and two children reside at 912 Cypress, La Marque, Texas 77568.

MARTIN COLOR-MARKING.—As part of the continental color-marking program for the Purple Martin (*Progne subis*), martins in Grayson County, Texas, will be color-banded with yellow and blue bands on the left leg. Additionally, the yellow bands of these Grayson County martins will be etched with black numerals. Observers who sight color-banded birds are urged to look for numerals. All sightings should be reported to the Bird Banding Laboratory, Laurel, Maryland 20811 and to Charles R. Brown, 2601 Turtle Creek Dr., Sherman, Texas 75090.

SUGGESTIONS TO AUTHORS

The *Bulletin of the Texas Ornithological Society* publishes articles and notes on original ornithological research or observations. Articles and notes dealing with Texas birds are preferred. General articles on topics of interest to TOS members are also welcomed.

All manuscripts should be submitted in duplicate to the editor. Each manuscript will be read by one or more reviewers who will provide the editor advice on the article's acceptability and accuracy.

Manuscripts, including tables, should be typewritten and double-spaced on one side of $8\frac{1}{2} \times 11$ inch ($21\frac{1}{2} \times 28$ cm) paper. Submitted articles, notes and reviews should follow the format observed in this and subsequent issues of the *Bulletin of the Texas Ornithological Society*. Feature articles should include a "literature cited" section. Shorter articles and notes, with five cited works or less, should use parenthetical citations, e.g. (Oberholser 1974, *The Bird Life of Texas*, Univ. Texas Press, Austin).

Scientific and common names of North American birds should follow the 1957 A.O.U. Check-list and supplements. The 24-hour clock (0730), the continental dating convention (2 October 1976), and the metric system should be used.

Proofs of articles and notes will be sent to authors for review and correction. Immediate return of proofs is necessary. Reprints of articles, notes, and reviews may be ordered on forms sent with proofs.

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Burrowing Owl (*Speotyto cunicularia*) from Texas City dike, November 1977.
Photograph by Ted L. Eubanks, Jr.

